



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,401	11/12/2003	Alex Zhang	200209233-1	6870

22879 7590 09/10/2007
HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

OSMAN, RAMY M

ART UNIT	PAPER NUMBER
----------	--------------

2157

MAIL DATE	DELIVERY MODE
-----------	---------------

09/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

MN

Office Action Summary	Application No. 10/706,401	Applicant(s) ZHANG ET AL.	
	Examiner Ramy M. Osman	Art Unit 2157	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-17 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. This action is responsive to application filed on November 12, 2003. Claims 1-17 are pending examination.

Drawings

2. The drawings filed on 11/12/2003 are acknowledged and are acceptable.

Specification

3. The disclosure is objected to because of the following informality: ¶ 1 of the specification is missing application number.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 11 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. On line 4 it states "at least two tiers of server machines"; And on lines 8-10 it states allocating servers to "said tier of server machines...". However, it is unclear which tier is being referred to in regards to the allocation step. Clarification is requested.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1-3,5,7-16 rejected under 35 U.S.C. 102(b) as being Smorodinsky by (US Patent No 6,859,929).**

8. In reference to claim 1, Smorodinsky teaches a server system comprising:

at least two scaleable tiers of server machines (column 3 lines 19-35);

means for computing an average response time for the server system

to respond to at least one transaction request (column 4 line 53 – column 5 line 40); and

means for allocating a number of server machines for each tier of server machines such that the average response time for the at least one transaction request is less than or equal to a specified average response time (column 8 lines 22-67).

9. In reference to claim 2, Smorodinsky teaches the server system of claim 1 further comprising means for determining the costs associated with allocating the number of server machines at each tier of server machines (column 8 lines 22-67).

10. In reference to claim 3, Smorodinsky teaches the server system of claim 2 wherein said means for determining further comprises means for minimizing the costs associated with allocating the optimized number of server machines at each tier of server machines (column 8 lines 22-67).

11. In reference to claim 5, Smorodinsky teaches the server system of claim 1 further comprising at least one additional tier of server machines (column 3 lines 19-35).

12. In reference to claim 7, Smorodinsky teaches the server system of claim 1 wherein said means for computing further comprises a non-iterative queuing model for predicting the average server system response time in response to measured arrival rates of transaction requests into each tier of server machines, the average service demand at each of said server tiers and the number of servers allocated to each tier of server machines (column 4 line 53 – column 5 line 40).

13. In reference to claim 8, Smorodinsky teaches a method for allocating a server machine to at least two tiers of a server system, said method comprising:

computing an expected average response time as a function of transaction requests and the amount of resources allocated to each tier of a server system (column 8 lines 22-67);

determining whether an optimization problem is feasible (column 8 lines 22-67);

computing a lower bound and an upper bound on the number of server machines at each tier of said server system required to meet the average response time (column 6 line 50 – column 7 line 45); and

computing a solution specifying a number of server machines allocated to each tier of said server system such that transaction requests have an average response time less than or equal to a pre-determined limit (column 8 lines 22-67).

14. In reference to claim 9, Smorodinsky teaches the method of claim 8 wherein said computing an expected average response time further comprises: obtaining at least one input value for an average arrival rate of transaction requests into each tier of said server system;

obtaining at least one input value for an average service demand at each tier of said server system; and obtaining at least one input value for the number of server machines allocated at each tier of said server system (column 4 line 53 – column 5 line 40).

15. In reference to claim 10, Smorodinsky teaches a computer-readable medium comprising instructions for:

receiving selected input parameters representative of a server system having at least two tiers of server machines; computing an average response time for the server system to respond to at least one transaction request; and determining an allocation of server machines for each tier of server machines such that the average response time for the at least one transaction request is less than or equal to a specified average response time (column 4 line 53 – column 5 line 40).

16. In reference to claim 11, Smorodinsky teaches an assembly for allocating server machines in a server system comprising:

a pool of server machines; at least two tiers of server machines; means for computing an average response time for said tier of server machines to respond to a plurality of transaction requests (column 4 line 53 – column 5 line 40); and

means for allocating a number of server machines from said pool to said tier of server machines to minimize operating costs while responding to said transaction requests with a specified average response time (column 8 lines 22-67).

17. In reference to claim 12, Smorodinsky teaches the assembly of claim 11 further comprising at least one additional tier of server machines.

18. In reference to claim 13, Smorodinsky teaches the assembly of claim 11 further comprising: a contractual relationship between a system operator and at least one contracting

Art Unit: 2157

party; and means for adjusting prices charged by said system operator to said at least one contracting party in response to a change in the allocation of server machines in said tiers of said server system (column 6 lines 15-50).

19. In reference to claim 14, Smorodinsky teaches the assembly of claim 11 wherein said means for computing further comprises a non-iterative queuing model for predicting the average server system response time in response to measured arrival rates of transaction requests into said tiers of server machines, the average service demand at said tiers of server machines; and the number of servers allocated to said tiers of server machines (column 4 line 53 – column 5 line 40).

20. In reference to claim 15, Smorodinsky teaches a server system comprising:

an open queuing network of multiple server machines with each server machine having a processor-sharing queue with a single critical resource; at least two tiers of server machines (column 3 lines 19-35); and

a computer-readable medium comprising instructions for: (i) predicting the average system response time of said multiple server machines based on the arrival rate of transaction requests into each tier of server machines averaged over all transaction request types and the number of server machines allocated at each tier of server machines (column 4 line 53 – column 5 line 40);

(ii) solving a mathematical representation of an optimization objective and constraints of said server system (column 8 lines 22-67); and

(iii) determining a number of server machines for each tier of server machines in response to said predicted average system response time (column 8 lines 22-67).

21. In reference to claim 16, Smorodinsky teaches the server system of claim 15 wherein said mathematical representation comprises: a continuous-relaxation model of the mathematical optimization system; and an iterative bounding procedure (column 8 lines 22-67).

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. **Claims 6 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Smorodinsky by (US Patent No 6,859,929) in view of Sheets (US Patent No 6,816,905).**

24. In reference to claim 6, Smorodinsky teaches the server system of claim 1. Smorodinsky fails to explicitly further teach a contractual relationship between a system operator and at least one contracting party; and means for adjusting prices charged by said system operator to said at least one third party in response to a change in the allocation of server machines in at least two tiers of said server system. However, Sheets discloses allocating server machines for customer accounts for adjusting and reducing costs (column 5 lines 36-54 and column 19 lines 1-45).

It would have been obvious for one of ordinary skill in the art to modify Smorodinsky wherein a contractual relationship between a system operator and at least one contracting party; and means for adjusting prices charged by said system operator to said at least one third party in response to a change in the allocation of server machines in at least two tiers of said server

Art Unit: 2157

system as per the teachings of sheets for the purpose of dynamic management of servers and reducing operating costs.

25. In reference to claim 17, Smorodinsky teaches the server system of claim 15.

Smorodinsky fails to explicitly teach wherein said instructions for determining the number of server machines for each tier of server machines is in response to said predicted average system response time and at least one service level agreement (SLA) requirement. However, Sheets dynamically managing servers based on service level agreements (column 19 line 47 – column 20 line 15). It would have been obvious for one of ordinary skill in the art to modify Smorodinsky wherein said instructions for determining the number of server machines for each tier of server machines is in response to said predicted average system response time and at least one service level agreement (SLA) requirement as per the teachings of Sheets for the purpose of dynamic management of servers and reducing operating costs.

Allowable Subject Matter

26. Claim 4 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form, into all independent claims, including all of the limitations of the base claim and any intervening claims.

27. The following is a statement of reasons for the indication of allowable subject matter: The cited prior art references either only teach minor aspects of the invention or only teach the general environment of the invention. The prior art, neither singly or in combination, do not teach the claim limitations of claim 4. Particularly, a means operatively coupled to said server system for receiving input parameters and for solving:

$$\sqrt{\gamma} = \frac{\sum_{i=1}^n \sqrt{h_i s_i u_i}}{T - \sum_{i=1}^n s_i};$$

where gamma is the shadow price of the average response time; h_1, h_2, \dots, h_n are weights reflecting the cost of different types of servers located at each tier of server machines; s is the average service time; u is the measured average utilization rate expressed in a single-machine percentage; and T is the average response time.

Conclusion

28. The above rejections are based upon the broadest reasonable interpretation of the claims. Applicant is advised that the above specified citations of the relied upon prior art are only representative of the teachings of the prior art, and that any other supportive sections within the entirety of the reference (including any figures, incorporation by references, claims and priority documents) is implied as being applied to teach the scope of the claims.

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See attached Form 892.

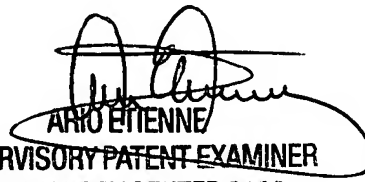
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramy M. Osman whose telephone number is (571) 272-4008. The examiner can normally be reached on M-F 9-5.

Art Unit: 2157

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571) 272-4001. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RMO
August 31, 2007


ARIO ETIENNE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100